



Science on the Web

Activity 8 The Winds

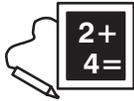
Jane had presented her findings to her father. He was quiet a long time, looking over the data she had given him and thinking about his concerned, bright daughter. He was deeply moved by her thoughtful considerations, troubled by her obvious concerns, and impressed by her ability to do such excellent research. When he asked her what her conclusions were, she was quick to list the pros and cons of each city. Her dad thanked her for the information and promised to talk about it with her mother.

Within a week, everything had changed. Her dad's company was not going to move him anywhere, but her parents were still thinking about making a big change in lifestyle. Jane couldn't understand it, but this move sounded better. They might just move a few miles away or a few hours away. She could still see her friends, at least sometimes.

But the surprises weren't over. Jane's parents seemed awfully restless, if that's what you could call it. First they were thinking of Tokyo, and now a trip East to see family. They all hadn't flown across the country in about 5 years, and now they were going to in a matter of days.

Richard had already started whining about the trip and how long it would take to get there. Printed on the tickets were the departure and landing time, so he knew how long the trip should take. But his father reminded him that if they had a good tail wind, the flight could be shorter. Richard was intrigued by that. He asked Jane to find out about the winds. Oh sure, she thought, and put it out of her mind. She started packing the night before, because there wouldn't be much time after school before they left. She thought she'd need clothes for cool weather, then changed her mind, then changed again. She wished she knew what to do. Then she realized she could get weather information on the Internet during second period. And while she was at it, she might just check the winds for Richard.





Checking Weather

A huge weather data site is at Purdue University. We can look at lots of types of data here, but let's start by looking at elevations across the U.S.

<http://wxp.atms.purdue.edu>

USGS Maps

Look at the elevation map on this page. *Click* on your area of the country and see what elevation changes you can recognize near your home. Check mountainous areas of the country and see how they differ from the plains areas.

Go **Back** or to Main

Surface Map

Contour Plots

North America Temperature Countour

The contour map of North America lets you see the temperature of Florida as well as the northernmost part of Alaska. How big a range of temperatures is shown today?

Go back to the Surface Data page. Look at the Composite Map Plot. You can see regional maps like these for where you live.

Regional Data Plots

Southwestern US Data Plot You should be able to pick out L.A.

Mid Atlantic Data Plot You can see Long Island at the top of the map.

So what do the funny flag-like symbols and the numbers mean? To read surface weather maps you need a little more information.

Details For More Information

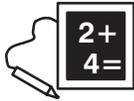
Info Surface Data Plot Read what the symbols mean.

Go **Back** and look at some regional plots, now that you know what the symbols mean.



Questions

- 8-1. What are the temperatures in Los Angeles and in Washington, D.C., today?
- 8-2. What is the wind direction and speed in each city?
- 8-3. What is the sky cover in each city?
- 8-4. What is the barometric pressure in millibars in each city? (*Hint: on surface maps "987" means 998.7 millibars; "183" means 1018.3 millibars.*)



Going to 30,000 feet

Now let's look at the Upper Air! In the Purdue University WXP home page ([Main](#))

[Upper Air](#)

[Details For More Information](#)

Be sure you know how to read these maps. They are like the surface ones, so just scan this information to answer the questions below.



Questions

- 8–5. How are the Upper Air data obtained?
- 8–6. How often are measurements made?
- 8–7. What is the approximate barometric pressure at 30,000 feet?
- 8–8. How are the weather symbols used on the Upper Air maps? (Although the symbols used are identical, there are differences in how they are used on Surface Maps and on Upper Air Maps.)

You are now ready to look at the maps for 30,000 feet.

Go **Back** to the Upper Air Data

[Constant Height Plots](#)

[300 mb Map](#)

You'll see a weather map that looks a lot like the surface map, only there are fewer data points (can you guess why?).



Questions

- 8–9. Draw an imaginary line between Los Angeles and Washington on the 300 mb map. What wind directions and speeds do you find for stations on or near the flight path?
- 8–10. What is the prevailing (typical) direction at 30,000 feet? Will the wind help or hinder an aircraft flying from Los Angeles to Washington?
- 8–11. What will be the temperature of the air outside the aircraft at 30,000 feet?
- 8–12. What time were the 300 mb wind-speed contour data taken?
- 8–13. On the 300 mb map, how does the speed in knots vary over the path from L.A. to Washington?
- 8–14. What is the fastest wind speed (in knots) that will be encountered on the flight? What is the fastest wind speed in miles per hour?

